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State Committee ⁽⁶¹⁾ for Inventions and Discoveries of the USSR Council of Ministers ⁽²¹⁾ ⁽²²⁾ ⁽²³⁾ ⁽⁴³⁾ ⁽⁴⁵⁾	Supplemental to Authorship Certificate No.: — Filed: Sept. 11, 1970 1474783/22-3 with Application No. attached Priority: — Published: Feb. 25, 1976, <i>Bulletin</i> No. 7 Date of publication of specification: April 9, 1976	(51) International classification ² E 21B 13/10 (53) UDC 622.248.4 (088.8) <i>also</i> <i>now</i>

(72) Inventors: F. F. Konrad, I. A. Sidorov, A. L. Volik, S. A. Alekhin, G. V. Zubritskii, and V. V. Gagina

(71) Applicant: Krasnodar Branch of the All-Union Petroleum Scientific Research Institute

(54) DEVICE FOR REPAIRS INSIDE A STRING

A device is known for repairs inside a string in oil, water, and gas wells, which includes a forming mandrel, a hollow rod, a cone swage, a divider, a hydraulic pusher, and a check valve. However, that device does not ensure a tight fit of the entire surface of the expandable patch against the string wall.

The object of the invention is to improve the quality of repairs. To accomplish this, in the proposed device the shaping mandrel is made of movable sectors with limiting lugs positioned on a flexible cylindrical diaphragm.

The proposed device is shown in the drawing.

It comprises a hollow rod 1, a stop 2, a cone swage 3, a divider 4 in whose body 5 piston 6 is located, and the forming mandrel, in whose body 7 the flexible diaphragm 8, movable sectors 9, and cireclips 10 are confined. Further, the device contains a hydraulic pusher 11, which consists of a piston 12 mounted in a body 13, and a check valve 14.

The pressure generated is conveyed to diaphragm 8, which, upon expanding, forces movable sectors 9 to move. The latter travels to the stop *a* of their limiting lugs the lugs of body 7 of the forming mandrel. At the same time, the cone swage, which has been set in axial motion, enters the cylindrical metal patch and preliminarily expands it.

The forming mandrel with an outside diameter necessary for accurately deforming the patch to the inside profile of the pipe being repaired and for providing tight contact between them immediately follows cone swage 3 into the preexpanded patch.

The amount of force conveyed to sectors 9 is adjusted by changing the pressure of the fluid supplied. Further movement of the cone swage and forming mandrel is accomplished by pulling up the pipes to which the device is secured. When this is done, hollow rod 1, moving upward, draws [illegible] of the body of

hydraulic device 11 closer to piston 12, that is, it recharges the hydraulic pusher for further use if needed.

Claims

A device for repairs inside a string, which consists of a forming mandrel, a hollow rod, a stop, a cone swage, a divider, a hydraulic pusher, and a check valve, said device being *distinctive* in that in order to improve the quality of repairs, the mandrel is made of movable sectors with limiting lugs positioned on a flexible cylindrical diaphragm.